ESCO
WORLD CLASS. WORLDWIDE.

Lexicon®

Ultra-low Temperature Freezer

ULT Vault for Your Samples

Esco Lexicon® Ultra-low Temperature Freezers

ULT Vault for Your Samples

Introducing Lexicon®

Ultra-low temperature (ULT) freezers are widely used in scientific research for long-term storage of samples. As ULT freezers are often operated at -80°C continuously for years, reliability is of paramount importance to researchers.

Constructed from high quality proven components with energy efficient refrigeration design, Esco Lexicon® ULT freezers provide top notch protection that can withstand the test of time to guarantee the integrity of your samples.

Reliable 5" Insulation

5" thick polyurethane foamed in place in the main body for maximum product protection

4 Stainless Steel Shelves

- Provided with each unit
- Adjustable in position
- High quality

Optional Inventory Racking

- Adjustable side access rack that can accommodate both 2" and 3" boxes
- Drawer type racks for 2" and 3" boxes

Robust Cabinet Construction

Both the cabinet and chamber are constructed of eletrogalvanized steel with corrosion-resistant powder coating for durability

ISOCIDE ™ Coating

Antimicrobial coating eliminates 99.9% of surface bacteria within 24 hours of exposure

Excellent Door Seals

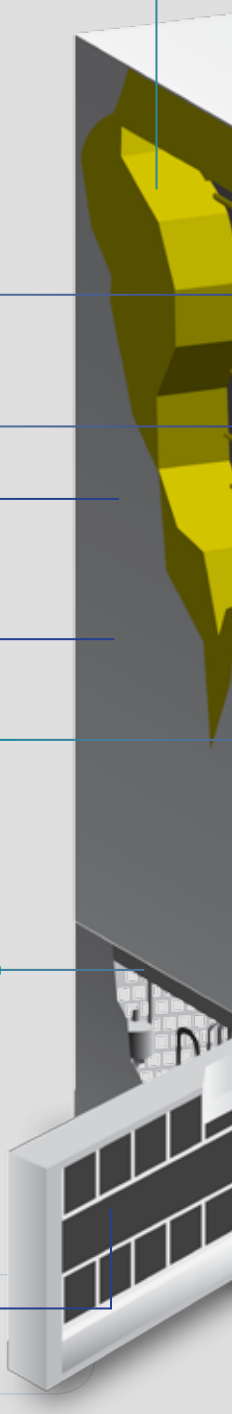
- Triple gasket seal provides maximum protection against thermal intrusion
- Gasket is heated to prevent frost built-up and facilitate easy door closing

Proven Refrigeration Components

- High performance reliable compressors
- Condenser is optimized to provide maximum efficiency in even the most extreme ambient conditions
- Condenser fans are quiet operating while generating high air flow

Front-mounted Condenser Filter

- Easily accessible without tools
- Washable



Sample Port

1" (25mm) diameter for easy access through wall

Insulated Main Door

- Minimum 4.5'' (114 mm) CFC-free, foamed-in-place polyurethane insulation for thermal containment and structural support
- 3 durable main door hinges are used.

Heated Pressure Equalization Port (PEP)

- Heated port with spring-assisted mechanism to prevent icing on the vent
- Prevents vacuum formation, allowing door to be re-opened quickly
- Located on the main door for easy cleaning

5 Individual Inner Doors

- 5 individual inner doors can be opened independently to minimize sample exposure
- 1 continuous stainless steel hinge is used for excellent alignment of the inner doors to ensure a good seal
- Magnetic door contact for rapid closure

Ergonomic Door Handle

- Ergonomic door handle allows one-handed door opening
- Key lock provided with every unit to prevent unauthorized access

Optional Chart Recorder

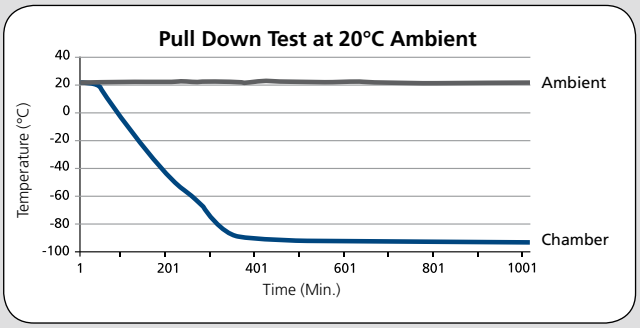
- Front-mounted
- For independent temperature monitoring

Caster Wheel

Robust, adjustable, lockable

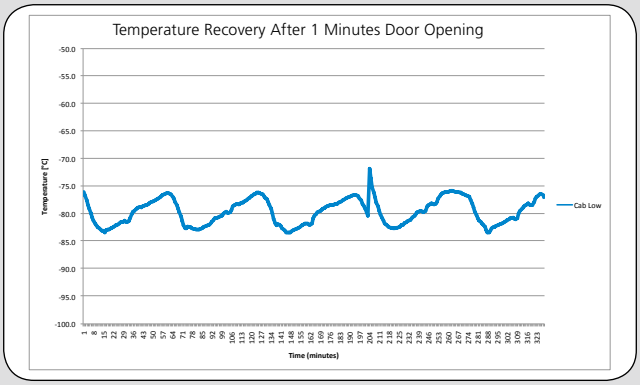
Superior Performance

Fast Pull Down



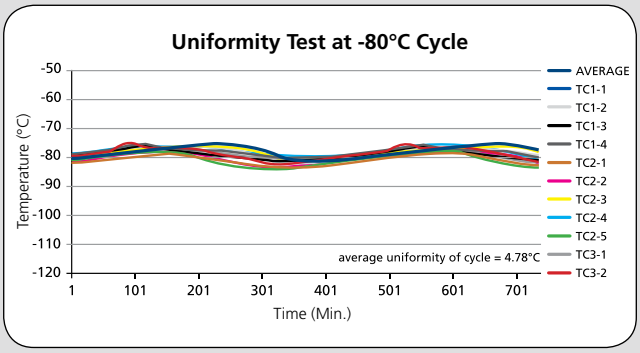
- Pull down time is the time required to bring down the temperature of the ULT freezer from ambient to the set temperature.
- Esco Lexicon® has a short pull down time which signifies an efficient refrigeration system*.

Fast Temperature Recovery After Door Opening



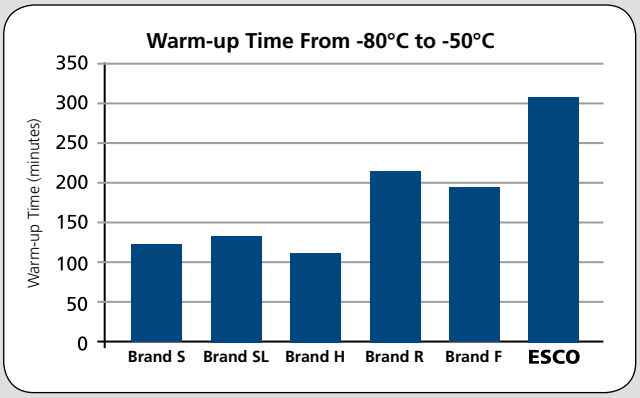
- Esco Lexicon® recovers temperature in minutes following a 1 min. door opening*. Fast recovery in temperature ensures integrity of stored samples.

Excellent Uniformity



- Uniformity test measures the difference between the coldest spot and warmest spot in the freezer chamber when the freezer is operating at set temperature.
- Esco Lexicon® has excellent uniformity under normal operating conditions*. This guarantees that all samples are stored at or close to desired set temperature.

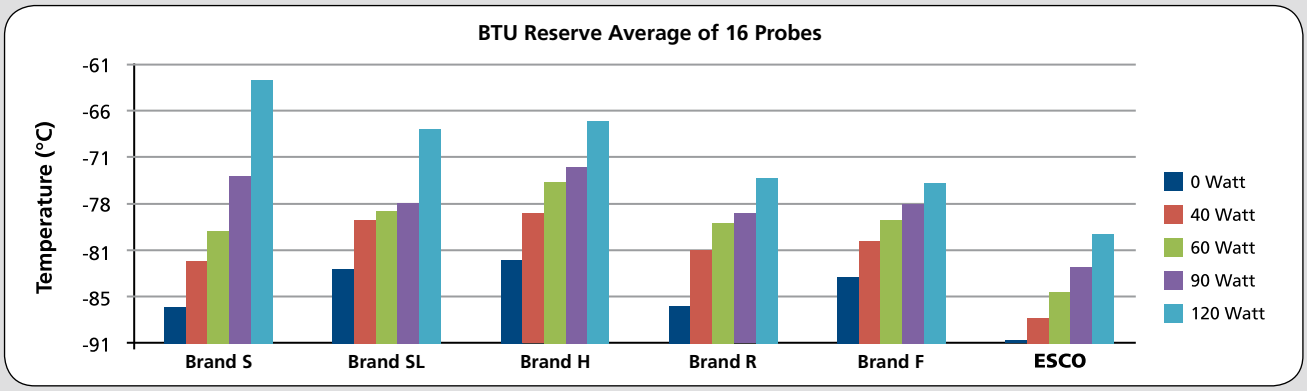
Extended Warm-up Time During a Power Failure



- Warm-up time measures the time taken for temperature to rise up (from -80°C to -50°C) when the power is interrupted.
- With a robust insulation system in place, Esco Lexicon® has probably the longest warm-up time among the freezers compared on the left*. Slower warm-up during an extended power failure buys the user time for carrying out a back-up plan.

** Units were factory tested under controlled environmental conditions per Esco method. Esco does not guarantee identical results in the field under differing conditions. Original report available upon request. UUS-668A-1 units were used for all the tests above.*

Large Reserve Capacity



- Reserve capacity test records the lowest temperature the freezer is able to sustain when a heat source is placed in the freezer. This resembles real life situations when hot samples are placed in the freezer. The lower the temperature the freezer can sustain, the higher chance the freezer can maintain the set temperature when warm samples are placed in the freezer.
- Esco reserve capacity surpasses that of all major brands tested above.

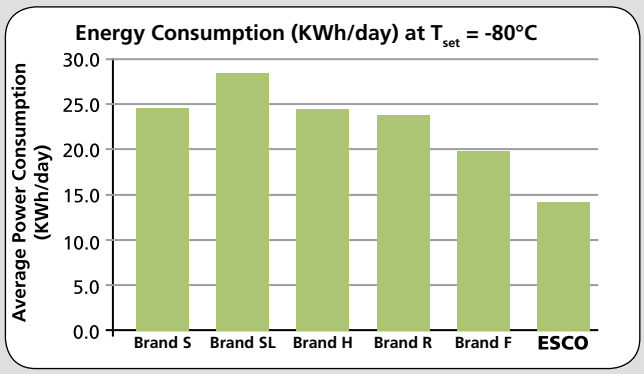
Quiet - Low Noise Operation

- According to OSHA 1910.95 Occupational Noise Exposure Regulation, the sound level of the work place has to fall below 90 dBA for an employee who works 8 hours/day.
- Total noise in a lab is highly dependent upon the equipment that emits the greatest amount of noise.
- Esco Lexicon® ultra-low freezer has a noise level of approximately 56 dBA*. This ensures a quiet and pleasant working environment for lab users.

Green Product

Energy Efficient

Low Energy Consumption



Esco UUS-668A-1 energy usage (KWh/day)	14.2*
Estimated conventional freezer energy usage (KWh/day)	24.3**
10 year energy cost savings over conventional freezer in USD (based on 0.10$/KWh)	3686.5
10 year carbon footprint reduction over conventional freezer in kg CO_2 (0.58kg CO2/kWh)	21381.7

Esco energy consumption is the lowest of all manufacturer's conventional ULT freezers of similar size compared above*.

Low Heat Emission To Ambient

Esco UUS-668A-1 Heat Emission to lab space (KW)	0.745*
Estimated conventional freezer heat emission (KW)	0.915
Less amount of heat emitted that needs to be removed by air-conditioner in the lab space (KWh/Day)	4.08
10 year energy cost savings over conventional freezer in USD (based on 0.10$/KWh)	1489.2

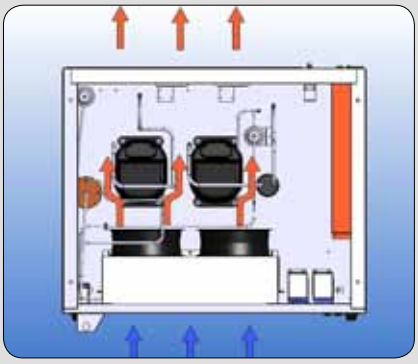
- Less heat emission than conventional ULT freezers of similar size*.
- Substantial savings on air-conditioning costs.

** Units were factory tested under controlled environmental conditions per Esco method. Esco does not guarantee identical results in the field under differing conditions. Original report available upon request. UUS-668A-1 units were used for all the tests above.*

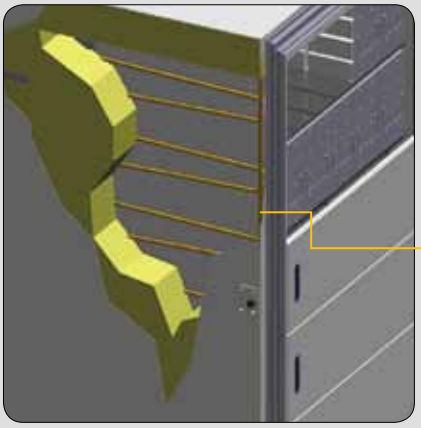
*** Average value of the Brand S to Brand F.*

Intelligent Design with Quality Components

Effective Cooling Technology



- 2-Stage cascade refrigeration system.
- Two fans are employed to draw consistent air flow from the front to the back of the freezer to cool the condenser.
- Two 1-Hp hermetic compressors operated at a low speed for longer life.
- The compressors sit directly behind the fans and are air-cooled for better operating conditions.



HeatRecycler™ Technology allows efficient recycling of the heat generated by the system. This reduces power consumption and prolongs the life of the freezer.

- Two additional "heat exchangers" to channel heat energy.
- "Mullion heater" recycles excess heat from 1st stage compressor to heat up main door gasket. This prevents ice from forming on the gasket and provides for easy door closing.

Superior Insulation System

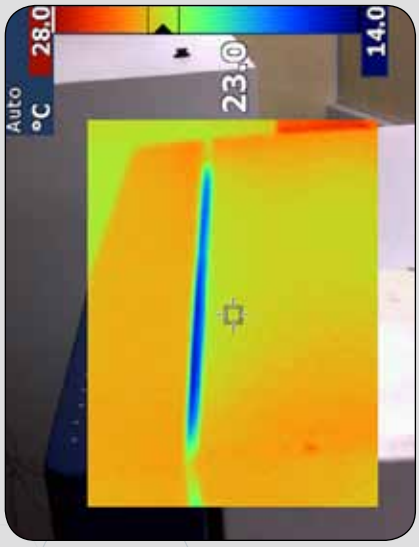
- Maximum product protection is provided by Lexicon's superior insulation system.
  - 5" thick polyurethane foamed in place in the main cabinet, 4.5" in the door.
  - Triple gasket seal protects against thermal leaks and prevents frost built-up.

Quality Components

All freezer components were selected from many tear-down and comparison tests. Only the most reliable components were selected.

- Danfoss® compressors are reliable and have high performance.
- Danfoss® filter drier is optimized for HFC refrigerants and uses 100% 3Å molecular sieve core for high moisture drying capacity. (Moisture equates to clogs in the system!).
- Condenser is oversized by design to provide a greater capacity for cooling.
- Condenser fans generate high air flow and have quiet operation.
- Energy efficient high performance oil separator eliminates solid contaminants along with excess oil from the system and enhances the entire system's performance.
- One seamless full wrap copper evaporator tube with no joints reduces any possibility of leaks in the field.
- Highly efficient corrosion resistant and pressure resistant heat exchanger used for maximum heat transfer.

Strict Process Control

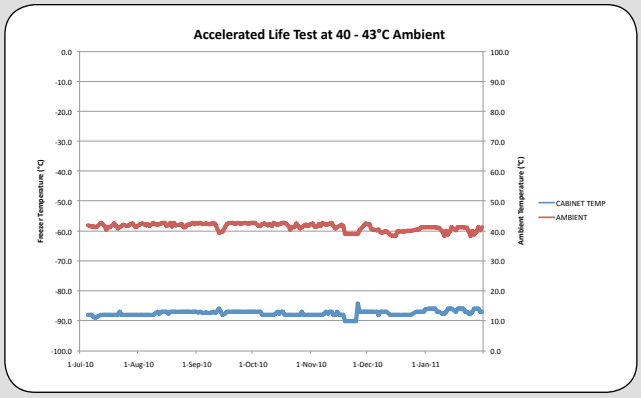


- First in the industry to use thermal imager to ensure cabinet integrity.
- Strict evacuation protocols and process controls to ensure a clean, dry, leak free system.
- Climate controlled assembly area to eliminate particulates and maintain a constant ambient temperature.
- Pre-flush all critical components to ensure all parts are clean prior to assembly.
- Computer controlled foaming machine to eliminate foaming variables.
- Advanced data logging system to ensure all units are tested and analyzed properly and documented.
- In-house designed and developed oil drying, evacuation and charging process equipment specifically designed for the manufacture of ultra-low cascade refrigeration systems.

QuickOpen™ Fast Door Re-Open System

- Esco designed Pressure Equalization Port (PEP) relieves the vacuum that is formed inside the chamber after door opening. PEP is heated to prevent ice formation on the port.
- Ergonomically designed door handle allows one-handed door opening.

Reliability Test



Esco has used industry-accepted Highly Accelerated Life Testing (HALT) to stress test a large number of Lexicon Freezers at extreme conditions. The Lexicon freezers passed these extreme stress tests insuring a design that is optimized to protect your precious samples.

In accordance with ANSI/ASHRAE 72-2005 and ARI 1200-2006/2008 guidelines and as tested by a UL validated third party test lab, DNS USA, the Esco Lexicon ULT Freezer surpassed the performance of 5 major competitors with lower energy consumption, superior cabinet performance (as measured by warm-up time), and demonstrated a larger BTU refrigeration reserve capacity.

Superior performance, lower energy costs, better protection.

Environmentally Friendly

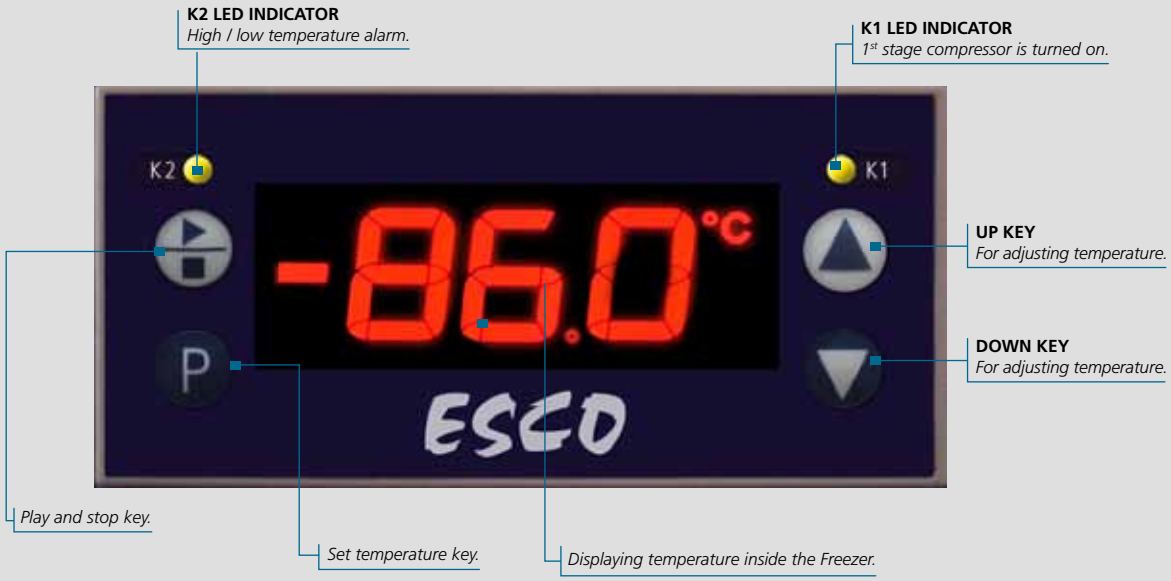
Green Product

- Only CFC-free blowing agent is used.
- Only environmentally friendly CFC-free and HCFC-free HFC refrigerants are used.
- CFC and HCFC compounds have high impact on the ozone in the Earth's atmosphere, where HFC does not contain chlorine and is not harmful to earth's atmosphere.
- Biodegradable, high-performance synthetic polyolester oil is used.

Easy to Service

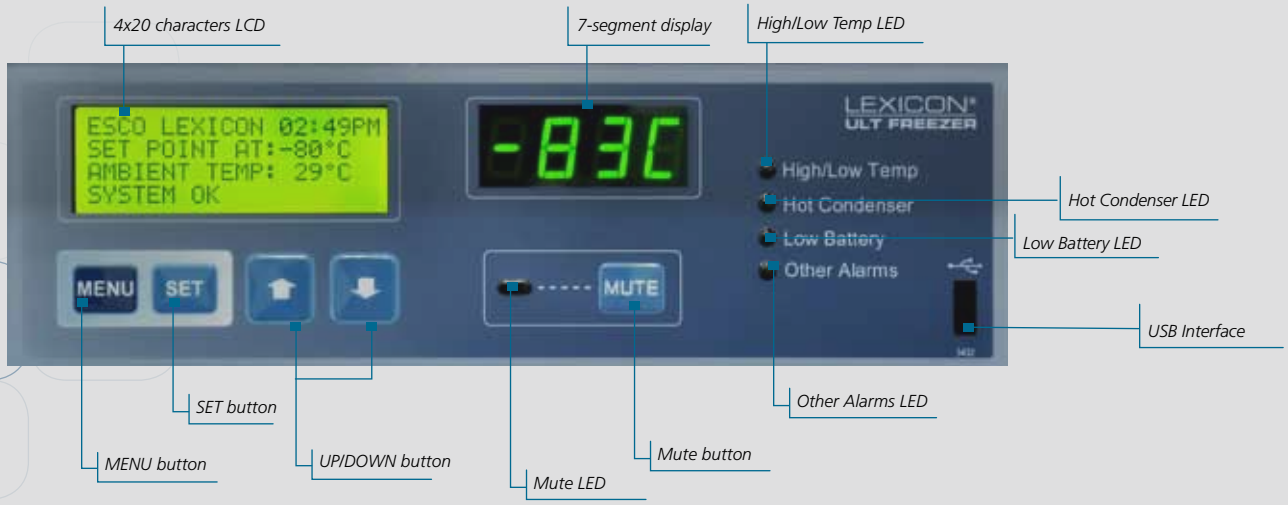
- Embedded thermocouples in the foam for easy field troubleshooting.
- Filter driers are located at the deck for easy replacement.
- Adjustable main door hinge and latch.
- Condenser filter is conveniently located at the front of the freezer. This allows easy access for inspection, cleaning and/or changing.
- 5 years warranty on compressors, 3 years on complete system.

S-Series Controller



- Commercially available and easy to adjust.
- Power failure alarm and high / low temperature alarm are available for S-Series ULT freezers.
- Adjustable time delay function* with standard factory default setting of 1 minute.

U-Series Controller



Advanced features of U-series controller includes:

- LCD support & 4-Seven segment LED Display.
- Back-up battery function
- USB Pen drive interface to download the data from flash memory.
- Event Log -20 latest events are stored in the non-volatile memory.
- Parametric Data Log (2Mbyte) storage of 3 months at a rate of 2 minutes expandable to 4Mbyte.
- AC voltage sensing & Voltage stabilization.
- AC Voltage and frequency selection.
- Compressor and FAN control.
- Help Menu.

*Adjustable switch-on delay function (0...60min) with 1 minute increment

Options and Accessories

6" Chart Recorder, Temp, 115/230VAC 50/60HZ

The chart recorder provides an easy-to-read graph of data vs time. It is a reliable, accurate, and stable instrument, for on-the-spot written documentation of freezer chamber temperature. This model offers 6" chart of temperature data.

Modifiable Clip Rack for Standard 2-inch and/or 3-inch Boxes (UUS-552/668/793 model)

The modifiable clip rack is able to fit standard 5.25" x 5.25" x 2" (130 X 130 X 50 mm) boxes and/or standard 5.25" x 5.25" x 3" (130 X 130 X 80 mm) boxes by changing the position of the clips. It is made of stainless steel and has handles. Each Rack includes 6 L-Clips and 9 T-Clips.

Drawer type rack for 2-inch and/or 3-inch Boxes

- 2" Drawer type rack for UUS-439 model (228mm X 421mm X 140mm)
- 2" Drawer type rack for UUS-552/668/793 model (228mm X 558mm X 140mm)
- 3" Drawer type rack for UUS-439 model (246mm X 421mm X 140mm)
- 3" Drawer type rack for UUS-552/668/793 model (246mm X 558mm X 140mm)

Additional shelving kit

Each Lexicon® ULT freezer comes standard with 4 shelves and 16 clips.

Extra shelves are available and each shelf comes with 4 clips.

Standard Cardboard 2-inch Box

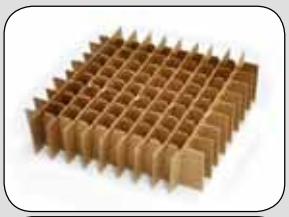
Fiberboard boxes have the dimension of 5.25"X5.25"X2" (or 130 X130X50 mm).

All boxes do not come with dividers. Dividers have to be ordered separately.

Standard Cardboard 3-inch Box

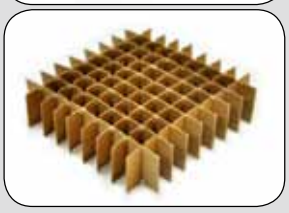
Fiberboard boxes have the dimension of 5.25"X5.25"X3" (or 130 X130X80 mm).

All boxes do not come with dividers. Dividers have to be ordered separately.



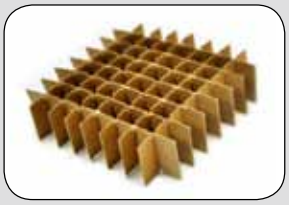
Standard Cardboard 100-cell Divider

100-cell Dividers are made of 10X10, 7/16" cells and each divider holds 100 12 mm wide vials.



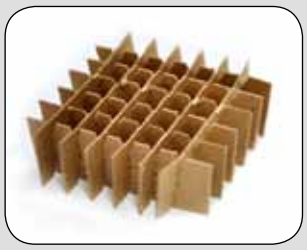
Standard Cardboard 81-cell Divider

81-cell Dividers are made of 9X9, 1/4" cells and each divider holds 81 13 mm wide vials.



Standard Cardboard 64-cell Divider

64-cell Dividers are made of 8X8, 9/16" cells and each divider holds 64 14 mm wide vials.



Standard Cardboard 49-cell Divider

49-cell Dividers are made of 7X7, 5/8" cells and each divider holds 49 16 mm wide vials.

LCO_2 Back-up System

CO_2 back-up system injects liquid CO_2 on demand when cabinet temperature warms to a pre-set level. Back-up system kits include all hardware except the supply cylinder. In the event of a power failure the system will operate on a charged battery.

- Temp. Range: -200°C to +50°C
- Resolution: 1°C
- Audio & visual alarms
- Relay output for central alarm systems or automatic dialers.
- Battery back-up with trickle charger
- Door safety interlock switch to prevent liquid CO_2 injection while door is open

LN_2 Back-up System

LN_2 back-up system injects liquid N_2 on demand when cabinet temperature warms to a pre-set level. Back-up system kits include all hardware except the supply cylinder. In the event of a power failure the system will operate on a charged battery.

- Temp. Range: -200°C to +50°C
- Resolution: 1°C
- Audio & visual alarms
- Relay output for central alarm systems or automatic dialers.
- Battery back-up with trickle charger
- Door safety interlock switch to prevent liquid N_2 injection while door is open

Ice Scraper

Ice scraper is available for cleaning ice built up on door gasket, PEP and other places in the freezer.

Cryo Safety Gloves

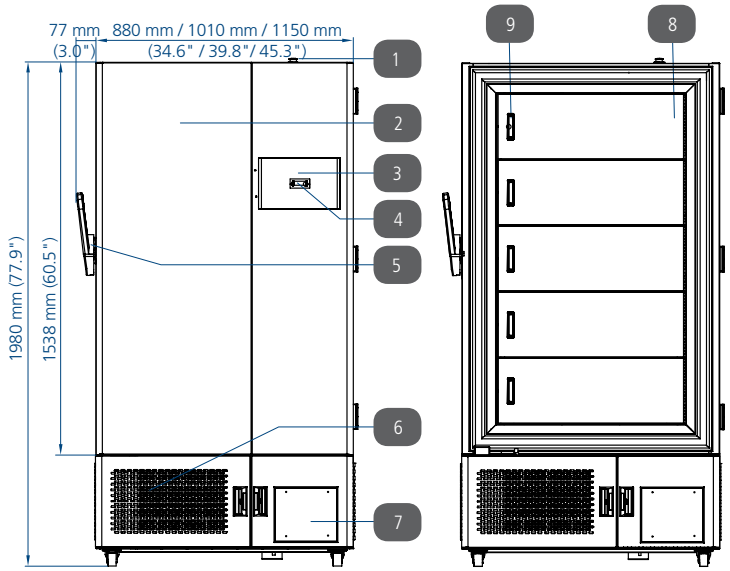
Mid-arm style cryo safety gloves are available for use with ultra-cold surfaces. Cryo safety gloves protect hands and arm when inserting or removing inventory.

IQ/OQ Protocol

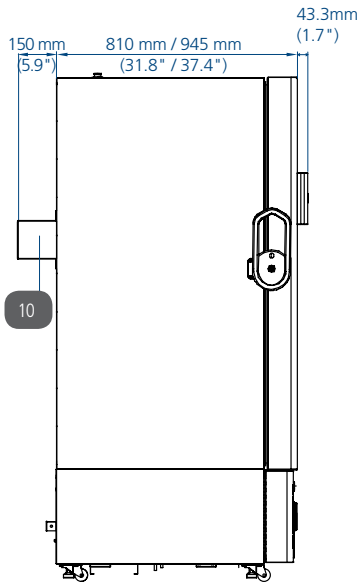
IQ/OQ protocol document is available for verifying that the equipment has been installed in accordance with installation specifications and is functioning and operating at the intended operational parameters.

S-Series

Front View



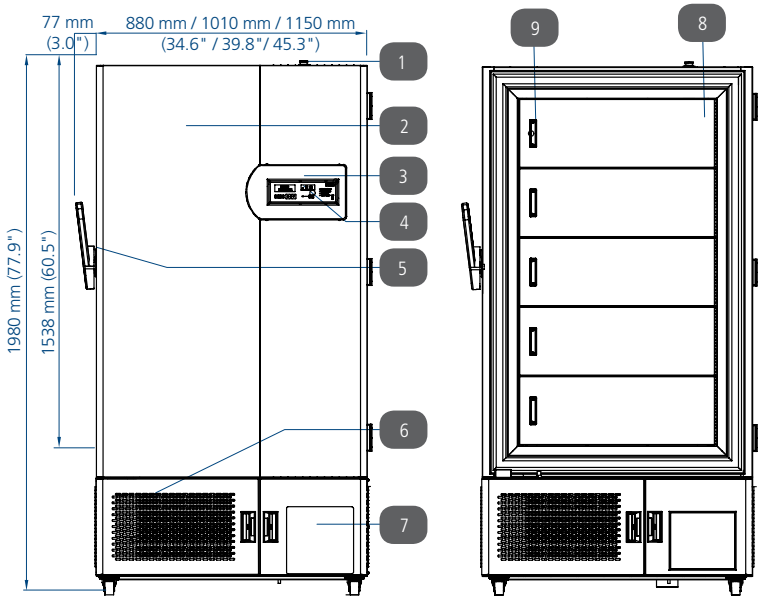
Side View



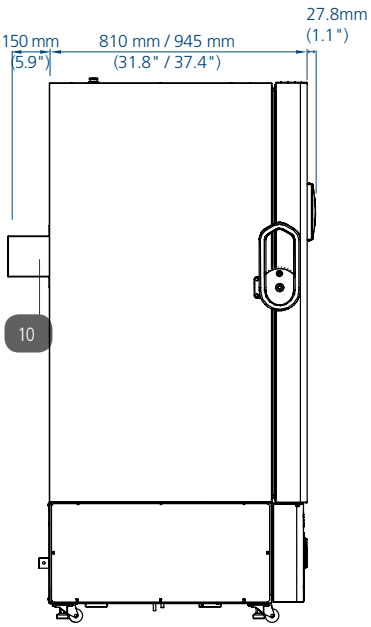
1. *Access port*
2. *Main door*
3. *PEP cover*
4. *S-series controller*
5. *Main door handle*
6. *Front bottom door*
7. *Chart recorder box (optional)*
8. *Inner doors*
9. *Embeded pulls*
10. *Omega bracket*

U-Series

Front View



Side View



1. *Access port*
2. *Main door*
3. *PEP cover*
4. *U-series controller*
5. *Main door handle*
6. *Front bottom door*
7. *Chart recorder box (optional)*
8. *Inner doors*
9. *Embeded pulls*
10. *Omega bracket*

Ordering Information

Models	Description
UUS-439A-1	Ultra low temp. freezer; Upright; 16 cu. Ft (439L); S-series controller; 230V, 50 hz
UUS-439B-1	Ultra low temp. freezer; Upright; 16 cu. Ft (439L); U-series controller; 230V, 50 hz
UUS-552A-1	Ultra low temp. freezer; Upright; 20 cu. Ft (552L); S-series controller; 230V, 50 hz
UUS-552B-1	Ultra low temp. freezer; Upright; 20 cu. Ft (552L); U-series controller; 230V, 50 hz
UUS-668A-1	Ultra low temp. freezer; Upright; 24 cu. Ft (668L); S-series controller; 230V, 50 hz
UUS-668B-1	Ultra low temp. freezer; Upright; 24 cu. Ft (668L); U-series controller; 230V, 50 hz
UUS-793A-1	Ultra low temp. freezer; Upright; 28 cu. Ft (793L); S-series controller; 230V, 50 hz
UUS-793B-1	Ultra low temp. freezer; Upright; 28 cu. Ft (793L); U-series controller; 230V, 50 hz

Accessories	Description
1080585-U	Accessory, Chart Recorder, 115/230VAC 50/60HZ
1180060-U	Accessory, Modifiable Clip Rack for Standard 2-inch High Boxes and/or 3-inch High Boxes
5070464-U	Accessory, Additional shelving kit for UUS-439
5070465-U	Accessory, Additional shelving kit for UUS-552
5170356-U	Accessory, Additional shelving kit for UUS-668
5070466-U	Accessory, Additional shelving kit for UUS-793
1180061-U	Accessory, Standard Cardboard 2-inch Box
1180062-U	Accessory, Standard Cardboard 3-inch Box
1180063-U	Accessory, Standard Cardboard 100-Cell Divider
1180064-U	Accessory, Standard Cardboard 81-Cell Divider
1180065-U	Accessory, Standard Cardboard 64-Cell Divider
1180066-U	Accessory, Standard Cardboard 49-Cell Divider
5170358-U	Accessory, LCO_2 back-up system
5170357-U	Accessory, LN_2 back-up system
9010103-U	Accessory, Ice Scraper
9010102-U	Accessory, Cryo Safety Gloves
9010101-U	Accessory, IQ/OQ Documentation
1260015-U	2" Drawer type rack for UUS-439 model
1260016-U	2" Drawer type rack for UUS-552/668/793 model
1260017-U	3" Drawer type rack for UUS-439 model
1260018-U	3" Drawer type rack for UUS-552/668/793 model
5250001-U	Voyager Software Kit

* *U-field installed by user; T- field installed by technician; F-factory installed*

Lexicon® General Specification

Model		UUS-439A-1 / UUS-439B-1	UUS-552A-1 / UUS-552B-1	UUS-668A-1 / UUS-668B-1	UUS-793A-1 / UUS-793B-1
Temp. Range		-50 to -86˚C			
Cooling performance at ambient 25°C - no load		-86˚C			
Ambient Temp. Range		15 to 32˚C (59 to 89˚F)			
External Dimension (W x D x H)		880 x 810 x 1980 mm (34.6" x 31.9" x 78")	880 x 945 x 1980 mm (34.6" x 37.4" x 78")	1010 x 945 x 1980 mm (40.0" x 37.4" x 78")	1150 x 945 x 1980 mm (45.3" x 37.4" x 78")
True External Dimension (W x D x H)	S-Series Controller	957 x 853 x 1992 (37.6" x 33.5" x 78.4")	957 x 988 x 1992 (37.6" x 38.8" x 78.4")	1087 x 988 x 1992 (42.7" x 38.8" x 78.4")	1227 x 988 x 1992 (48.3" x 38.8" x 78.4")
	U-Series Controller	957 x 838 x 1992 (37.6" x 32.9" x 78.4")	957 x 973 x 1992 (37.6" x 38.3" x 78.4")	1087 x 973 x 1992 (42.7" x 38.3" x 78.4")	1227 x 973 x 1992 (48.3" x 38.3" x 78.4")
Internal Dimension (W x D x H)		620 x 543.8 x 1304 (24.4 x 21.4 x 51.3)	620 x 683.8 x 1304 (24.4 x 26.9 x 51.3)	750 x 685 x 1304 mm (30.0" x 27.0" x 51.0")	890 x 683.8 x 1304 (35 x 26.9 x 51.3)
Capacity		439.7 L (15.5 cu.ft)	552.8 L (19.5 cu.ft)	668.8 L (23.6 cu.ft)	793.6 L (28 cu.ft)
Electrical Rating		12/13A 230V 50 Hz 1Ø	12/13A 230V 50 Hz 1Ø	12/13A 230V 50 Hz 1Ø	12/13A 230V 50 Hz 1Ø
Compressor		2 hermetic 1.0 hp compressors			
Condenser		Enhanced finned-tube, forced-air cooled condenser			
Insulation Type		Polyurethane foam			
Refrigerant Type		Environmentally friendly HFC refrigerants			
Temperature Controller		S-Series (Microprocessor Controller) U-Series (Industrial Digital Controller)			
Number of Outer / Inner Doors		1 / 5			
Shelves	Material	SS304, adjustable, 4 shelves			
	Shelf Area (W x D)	608 x 481 mm (23.9" x 18.9")	608 x 611 mm (23.9" x 24")	738 x 611 mm (28.9" x 25.1")	878 x 611 mm (34.5" x 24")
	Max Load	50 kg (110 lbs)			
Storage Box Capacity (With Modifiable Clip Rack)	2" Box	240	320	400	480
	3" Box	180	240	300	360
Storage Box Capacity (With Drawer type Rack)	2" Box	240	320	400	480
	3" Box	180	240	300	360
Vacuum Relief Device		check valve type			
Access port		dia 25mm -1 port			
Refrigerant and foam		Environmentally safe and friendly refrigerants and foaming chemicals			
Refrigerant type		HFC			
Compressor		Hermetic			
Access port		dia 25mm (1") -1 port			
Vacuum Relief Device		Check Valve Type			
Chart Recorder		option			
LCO_2 Back up-External		option			
Inventory Rack		option			
Access Port		Ø 25 mm (1") - 1 port			
Electrical Rating / Full Load Amps		230V, 50Hz, 1Φ / 12A / 20A dedicated			
Power Consumption at -80˚C		Approximately 14.1 KWh/day	Approximately 16.0 KWh/day	Approximately 14.2 KWh/day	Approximately 17.8 KWh/day
Net Weight		291.5 kg (642 lbs)	321 kg (708 lbs)	326.5 kg (720 lbs)	375 kg (826 lbs)
Shipping Weight		335.2 kg (739 lbs)	369 kg (813 lbs)	378 kg (833 lbs)	421.2 kg (928 lbs)
Shipping Dimensions (W x D x H)		1008 x 938 x 2121 mm (39.6" x 36.9" x 83.5")	1008 x 1068 x 2121 mm (39.6" x 42.0" x 83.5")	1138 x 1068 x 2121 mm (44.8" x 42.0" x 83.5")	1278 x 1068 x 2121 mm (50.3 x 42.0 x 83.5")

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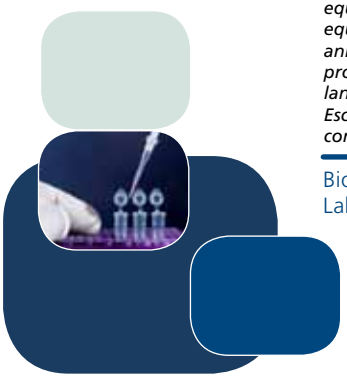

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